IN THE ABSTRACT OF THE DISCLOSURE:

Line 4, delete "24";

line 5, delete "17";

line 6, delete "26";

line 7, delete "14";

line 8, delete "24".

REMARKS

The specification has been amended to correct errors of a typographical and grammatical nature. Due to the number of corrections thereto, applicants submit herewith a Substitute Specification, along with a marked-up copy of the original specification for the Examiner's convenience. The substitute specification includes the changes as shown in the marked-up copy and includes no new matter. Therefore, entry of the Substitute Specification is respectfully requested.
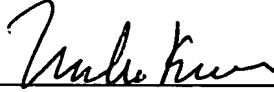
The claims have also been amended to more clearly describe the features of the present invention, and the abstract has been amended to delete the reference numerals therein.

Entry of the preliminary amendments and examination of the application is respectfully requested.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this
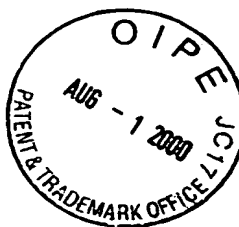
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paper, including extension of time fees, to Deposit Account

No. 01-2135 (501.38087X00) and please credit any excess fees

to such deposit account.

Respectfully submitted,

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Attachments
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Title of the Invention

MONITOR DEVICE FOR DISPLAYING OUTPUT DISPLAY IMAGES

OF A PLURALITY OF COMPUTERS

BACKGROUND OF THE INVENTION

The present invention relates to a monitor device for use in computers.

Usually, a desktop or any other stationary type computer is equipped with an easy-to-look-at large monitor device and easy-to-handle input devices such as a keyboard and a mouse. On the other hand, a laptop or palmtop type portable computer is [provided] designed with a view to reducing the size and weight of the unit, with input used devices such as a small keyboard and a pointing device, whose handling ease is sacrificed for size and weight reduction, and with a less easy-to-look-at small monitor, all integrated into the computer.

A monitor device provided on a stationary computer can receive no more than one image input at a time. As a result, if a monitor device used for displaying output display images [of] on a computer is to be used for displaying the output display images of another computer, the connection between the monitor device and the computer needs to [should] be rewired. Or else, the connection between the monitor device and the computer needs to [should] be switched over with a separately provided

selector or the like. This is also true of input devices. If an input device used for inputting _information_ to a computer is to be used for inputting _information_ to another computer, the connection between the input device and the computer [should] _needs to_ be rewired. Or else, the connection between the input device and the computer [should] _needs to_ be switched over with _the use of_ a separately provided selector or the like.

Sometimes one user may want to use a plurality of computers at the same time. In such a case, however, as input devices and monitor devices are separately provided for different computers, the user should use a different input device or look at a different monitor device for each computer. Especially where one computer is a laptop computer and another is a stationary computer, in spite of the presence in the same location of a better visible monitor device and a better operable input device provided for the stationary computer, the monitor and input device _which is_ inferior in visibility and operability provided for the laptop computer should be used when that laptop unit is to be operated.

Thus [In such a case], it is possible to use a monitor device and input device provided for one computer [as ones for] _in the operation of_ another computer _, but only_ by either rewiring the connections of the monitor device and input device to the computer or _by_ providing and operating separate selector switches.

However, even in such an arrangement, the image
displayed on the monitor device at a given time is the output
display image of only one computer, and accordingly, the user
cannot check the output display images of a plurality of
computers at the same time. Moreover, where the computer
to be operated is changed frequently, the user has to leave
the input device he or she is operating and rewire the input
and monitor devices or to manipulate the separately provided
switches every time the computer is changed.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a
monitor device which is capable of displaying output display images
of a plurality of computers at the same time.

Another object of the invention is to enable the user
to use, without having to leave a specific input device, that
specific input device and a specific monitor device as the
monitor device and input device of a plurality of computers.

In order to achieve the above-stated objects, a
monitor device according to the present invention comprises a
plurality of display data interfacing units for entering
display data from individual computers; a plurality of
communication data interfacing units for
inputting/outputting communication data between the
individual computers; a superposed display unit for

superposed [displaying] of two or more images represented by

display data entered into two or more of the display data

interfacing units; and a display controller for altering the

form of the superposed [displaying] on the basis of

communication data for instructing alteration [in] the form

of superposed [displaying], which [are entered into] the

communication data interfacing units.

Such a monitor device can display output display

images from a plurality of [computer] at the same time.

Moreover, the capability to alter the form of superposed

[displaying] on the monitor device from the computers enables

the monitor device to adapt the display to the contents

desired to be checked, and accordingly the monitor device

can be used in practice as the monitor device for a plurality

of computers.

If this monitor device is equipped with one or more

input data interfacing units for entering input data from

an input device, and an input data repeater for supplying

from one communication data interfacing unit to be

dynamically selected out of the plurality of communication

data interfacing units, input data to be entered into a

computer [having] entered inputs into the input data

interfacing unit(s) to the computer carrying out

inputting/outputting from/to this communication data

interfacing unit, a specific input device can be used as the

input device for a plurality of computers.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a multi-computer system to which the present invention is applied.

Fig. 2 is a block diagram showing the connective relationships between the monitor device and other units in the multi-computer system.

Fig. 3 is a diagram which illustrates an example of a display on the monitor device.

Fig. 4 is a block diagram of the monitor device.

Fig. 5 is a block diagram of the communication controller of the monitor device.

Fig. 6 is a block diagram of the display controller of the monitor device.

Fig. 7 is a block diagram illustrating the configuration of the resolution/frequency converter of the monitor device.

Fig. 8 is a block diagram of the liquid data converter of the monitor device.

Fig. 9 is a perspective view of another mode of use of the multi-computer system to which the present invention is applied.

Fig. 10 is a block diagram showing the connective relationships between the monitor device and other units in the multi-computer system.

Fig. 11 is a block diagram of the monitor device.

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Fig. 12 is a block diagram of the communication

controller of the monitor device.

Fig. 13 [illustrates] ~~is a perspective view of~~ still another [mode of use] ~~embodiment~~ of the
~~multi-computer system to which the present~~
[monitor device]. ~~invention is applied~~

Fig. 14 [illustrates] ~~is a block diagram showing~~ the connective relationships
~~in the multi-computer system~~
between the monitor device and other units.

Fig. 15 illustrates an example of ~~is a diagram which~~ ~~a~~ display on the

monitor device.

Fig. 16 is a block diagram of the monitor device.

Fig. 17 is a block diagram of the communication

controller of the monitor device.

————————————Fig. 18 is a block diagram of the display controller————————————

of the monitor device.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A preferred embodiment of the present embodiment will

be described below.

Fig. 1 illustrates a mode of use of a monitor device ~~in a multi-computer system to which the present~~
~~invention is applied~~.
In the figure, [1 denotes] a monitor device [; 2], ~~the system comprises~~ a first
~~2~~
computer (hereinafter "first PC") [; and 3], ~~and~~ a second computer
~~3~~
(hereinafter "second PC"). The first PC 2 is a stationary

computer equipped with a keyboard 4 and a mouse 5 as input

devices. The second PC 3 is a laptop type computer with its

input devices, such as a keyboard and a pointing device,

integrated into it.

[Next,] Fig. 2 illustrates the connective relationships of the monitor device 1 to the first PC 2 and the second PC 3.

In Fig. 2, [13 denotes] a first PC connector, fitted to the first PC 2 for monitor connection[; 19,] a first monitor connector fitted to the monitor device 1 for first PC connection. Between the first PC connector 13 and the first monitor connector 19, [are wired] a first display data transmission line 14 for transmitting] to the monitor device 1 [first display data], which [are] display data supplied by the first PC 2, and a first communication data transmission line 15 [for transmitting and receiving communication data]

between the first PC 2 and the monitor device 1.

Further, [16 denotes] a second PC connector, fitted to the second PC 3 for monitor connection, and [20,] a second monitor connector fitted to the monitor device 1 for second PC connection. Between the second PC connector 16 and the second monitor connector 20 [are wired] a second display data transmission line 17 [for transmitting] to the monitor device 1 [second display data], which [are] display data supplied by the second PC 3, and a second communication data transmission line 18 for transmitting and receiving communication data between the second PC 3 and the monitor device 1.

The following description will refer to a case in which both the first display data and the second display data, respectively sent from the first PC 2 and the second PC 3 to the monitor device 1, are display data for color [displaying], [which are] R, G and B color data each of eight bits, transmitted in a low voltage differential signal (LVDS) system. In the case described below, both the first communication data transmission line 15 and the second communication data transmission line 18 are transmission lines for serial communication, known as universal serial buses (USB), though they may [as well] be transmission lines for faster serial communication satisfying the IEEE 1394 standard, other [ones] for serial communication, or [ones] for parallel communication.

As illustrated in Fig. 3, it is [made] possible to display a display image 7 corresponding to second display data from the second PC 3 within a display image 6 corresponding to first display data from the first PC 2 [to] the monitor device 1. It is further [made] possible to alter the position and/or size of the display image 7 [on] the second PC 3 or the contrast, brightness and/or position adjustment of display on the monitor device 1 from either the first PC 2 or the second PC 3. Communication between the first PC 2 and the second PC 3 via the monitor device 1 is also [made] possible.

The monitor device 1, which makes [possible] these actions, is illustrated in Fig. 4. In Fig. 4, [21 denotes] a communication controller[; 22,] a second resolution signal[;] [23,] a display position designation signal; [24,] a display controller[; 25,] liquid display data; [26,] a liquid display panel.

Each unit will be described in detail below.

First [will be described] the [actions] of the communication controller 21).

Fig. 5 illustrates the configuration of the communication controller 21.

The communication controller 21 comprises a communication data identifying unit 52, a window information generating unit 53 and a liquid data conversion control signal generating unit 127.

Now, communication data sent from the first PC 2 via the first communication data transmission line 15 and the communication data sent from the second PC 3 via the second communication data transmission line 18 are sent to a communication data identifying unit 52. The communication data transmitted via the first communication data transmission line 15 and the second communication data transmission line 18 are augmented with the destination of the communication data when they are transmitted. To communication data whose destination is the monitor device

1 is added an identifier representing the contents of the

communication data.

The contents of communication data to be transmitted

by the first PC 2 or the second PC 3 to the monitor device

1 include information indicating the display position

and/or the display size of the display image 7 on the second

PC 3, and information indicating the contrast, brightness

and/or position adjustment quantity of the display on the

monitor device 1. These communication data, in a state

wherein a predetermined unique identifier is added to it,

are entered into the communication data identifying unit 52. _when it determines that_

The communication data identifying unit 52, [if] the _the communication data received_

destination of [entry] from the first PC 2 via the first

communication data transmission line 15 is the

[communication data of the] second PC 3, transmits the data

as [they are] _is_ to the second PC 3 via the second communication _communication data received_

data transmission line 18. Or, if the destination of [entry]

from the second PC 3 via the second communication data

transmission line 18 is [the communication data of] the first

PC 2, the unit transmits the data as [they are] _is_ to the first

PC 2 via the first communication data transmission line 15.

This makes possible communication between the first

PC 2 and the second PC 3 via the monitor device 1. _communication data received_

On the other hand, if the destination of [entry] from

the first PC 2 via the first communication data transmission

line 15 is [the communication data of] the monitor device 1,
communication data received
or if the destination of [entry] from the second PC 3 via the

second communication data transmission line 18 is the

[communication data of the] monitor device 1, the identifier

representing the contents is discerned, and information

indicating the display position and/or the display size of

the display image 7 on the second PC 3 is transferred to the
via line 45
window information generating unit 53, or information

indicating the contrast, brightness and/or position

adjustment quantity of the display on the monitor device 1

is transferred to the liquid data conversion control signal
via line 12
generating unit 127.

in response
The window information generating unit 53, [according]

to the received information indicating the display position

and/or the display size, supplies the display controller 24

with a second resolution signal 22 representing the

magnitude (resolution) of the display image of the second

PC 3 and a display position signal 23 indicating the display

position and the presence or absence of display.

Incidentally, information indicating the display position

and/or the display size of the display image 7 on the second

PC 3, sent from either the first PC 2 or the second PC 3,
an indication
consists of the presence or absence of display, information

on the top left coordinates of the display image of the

second PC 3, and information on the number of lines in the

vertical direction and the number of dots in the horizontal direction.

The window information generating unit 53 supplies as the display position signal 23 a single bit signal which is "0" when the scanning position of the monitor device 1 is in a position in which the display image 7 of the second PC 3 is not displayed, or "1" when it is in a position in which the display image 7 of the second PC 3 is displayed. Further the window information generating unit 53 supplies as the resolution signal 22 a signal representing the number of dots in the horizontal direction in 10 bits and the number of dots in the vertical direction in 10 bits. Thus, as shown in Fig. 3, if a frame on the monitor device 1 consists of 1024 × 768 dots and the display image 7 on the second PC 3 consists of 640 × 480 dots in size and is to be displayed from the 10th dot in the horizontal direction and the 10th line in the vertical direction, the display position signal 23 will be "1" from the 10th to 489th lines in the vertical direction while the monitor device 1 is scanning the 10th to 649th dots in the horizontal direction, and the resolution signal 22 will be a signal indicating 640dots in the horizontal direction and 480 dots in the vertical direction.

On the other hand, the liquid data conversion control signal generating unit 127, in response according to the received information indicating the contrast, brightness and/or

position adjustment quantity of the display, supplies the

display controller 24 with a display position control signal

96 representing the position adjustment quantity of the

display of the monitor device 1, a display contrast control

signal 97 designating the contrast of the display of the

monitor device 1, and a display brightness control signal

98 designating the brightness of the display of the monitor

device 1.

Next, details of the display controller 24 will be described.

Fig. 6 illustrates the configuration of the display

controller 24. The display controller comprises

In the figure, 27 denotes a first data converter; 28,

a second data converter which outputs 28; 29 and first parallel data 30, a first

sync signal; 31, a second data converter which outputs second parallel data; 32, a resolution/

frequency converter 32 which outputs 33, window display parallel data; 34,

a data selector 34 which outputs 35, superposed display data; and 36, a

liquid data converter 36.

The first data converter 27 converts first display

data, which comprises LVDS signals received entered via the first display

data transmission line 14, into display data of R (red), G

(green) and B (blue), a vertical sync signal, a horizontal

sync signal, a display effective period signal, and a dot

clock signal, and supplies this data and signals them to the data selector 34 as the first

parallel data 29. It also supplies the resolution/frequency

converter 32 with the vertical sync signal, the horizontal sync signal and the dot clock signal as first sync signals 30.

The second data converter 28, like the first data converter 27, converts second display data, which comprises LVDS signals entered via the second display data transmission line 17, into display data of R (red), G (green) and B (blue), a vertical sync signal, a horizontal sync signal, a display effective period signal, and a dot clock signal, and supplies this data and signals to the data selector 34 as the second parallel data 31.

Here, display data contained in the first parallel data 29 and the second parallel data 31 are supposed to be display data of eight bits each of RGB (16.7 million color display).

The resolution/frequency converter 32 subjects the second parallel data 31 to resolution conversion in accordance with the resolution signal 22 and to frequency conversion so as to equalize their frequency to that of the first parallel data 29 in accordance with the first sync signal 30. Then it supplies the converted data as window display parallel data 33.

The resolution/frequency converter 32 is configured as illustrated in Fig. 7.

In the figure, the converter 32 comprises 37 a resolution converter, 38, which produces a resolution-converted sync signal 38 and 39 resolution-converted display data; 40 a write operation controller A

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[41], a write operation control signal; [42,] a read operation
controller[43], a read operation control signal; and [44,] a
window image storing unit.

The resolution converter 37 subjects the second
parallel data 31 to resolution conversion in accordance with
the resolution indicated by the resolution signal 22, and
supplies the converted data as resolution-converted display
data 39 together with the resolution-converted vertical
sync signal, the horizontal sync signal, and the
resolution-converted sync signal 38, which is a dot clock.
The write operation controller 40, on the basis of the
resolution-converted sync signal 38, generates the write
operation control signal 41, which is a timing signal for
temporarily storing the resolution-converted display data
39 into the window image storing unit 44.

The read operation controller 42, in order to display
the display image 7 on the second PC 3 within the display
image 6 on the first PC 2, generates the read operation
control signal 43 for reading the resolution-converted
display data 39 from the window image storing unit 44 as the
window display parallel data 33 to match the display
position of the display image 7 on the second PC 3 according
to the first sync signal 30, which is a sync signal out of
the first parallel data 29, and the display position signal
23. The window image storing unit 44, in accordance with

the write operation control signal 41, stores a single frame equivalent of the resolution-converted display data 39, and supplies it as the window display parallel data 33 in accordance with the read operation control signal 43.

Referring back to Fig. 6, the data selector 34, in accordance with the display position signal 23, switches the first parallel data 29 and the window display parallel data 33 so as to supply the window display parallel data 33 at the display timing of the display image 7 (on) ~of~ the second PC 3, and supplies (them) ~this data~ as the superposed display data 35. Here it supplies the first parallel data 29 when the display position signal 23 is "0" or the window display parallel data 33 when the signal is "1".

The liquid data converter 36 converts the superposed display data 35 consisting of parallel ~RGB~ data [of RGB] of eight bits each into input signals for the liquid crystal display 26, and supplies (them) ~this data~ as the liquid crystal display data 25.

Fig. 8 illustrates the configuration of this liquid data converter. ~the converter 36 comprises~ In the figure, [114 denotes] a liquid data generator [;] 114 ~which outputs~ [115,] unadjusted liquid crystal display data; [116,] 115 a tone characteristic converter; and [117,] a back light controller. 116 117

The liquid data generator 114 converts the superposed display data 35, consisting of the parallel ~RGB~ data [of RGB] of eight bits each and the sync signal, at the display timing

of the liquid crystal display 26. It supplies/(them) [this data] as the

unadjusted liquid crystal display data 115 and the liquid

crystal display sync signal 101, and, at the same time, it

controls the liquid crystal display sync signal 101 so as

to coordinate it with the display position of the whole frame

in accordance with the display position control signal 96.

The tone characteristic converter 116, in order to adjust

the display contrast, converts the tone characteristic of

the unadjusted liquid crystal display data 115 in accordance

with the display contrast control signal 97, and supplies [it]

the converted data as the liquid crystal display data 25.

If it is desired, for instance, to increase the contrast,

the [RGB] data [of RGB] of eight bits each are converted so as to

maximize the difference between the highest brightness and

the lowest brightness; or, if, conversely, it is desired to

decrease the contrast, the data [RGB] [of RGB] of eight bits each

are converted so as to reduce the data of the highest

brightness or to enhance the data of the lowest brightness.

The back light controller 117, in accordance with the

display brightness control signal 98, generates a liquid

crystal panel back light control signal 102 for controlling

the [a] back light of [a] [the] liquid crystal display 103.

As described above, it is possible to display the

display image 7 [on] [of] the second PC 3 in the display image 6

[on] [of] the first PC 2 [o f] [on] the monitor device 1. It is also possible

to alter, from either the first PC 2 or the second PC 3, the position and/or size of the display image 7 on the second PC 3 or the contrast, brightness and/or position adjustment of the display on the monitor device 1.

Now, altering the position and/or size of the display image 7 on the second PC 3 or the contrast, brightness and/or position adjustment of the display on the monitor device 1 from either the first PC 2 or the second PC 3 is accomplished in the following manner. It can be accomplished by, for instance, causing driver software controlling the monitor device 1 operating on either the first PC 2 or the second PC 3 to send instructions from the user to the monitor device 1 as described above.

Or else, altering the position and/or size of the display image 7 on the second PC 3 is accomplished, for instance, by managing the position and/or size of the display image 7 on the second PC 3, accepting the desired changes according to the manipulation of the mouse 3 by the user, and sending the pertinent instructions to the monitor device 1 as described above. Alternatively, it can [as well] also be accomplished by causing software working in coordination with the OS of the first PC 2 to operate on the first PC 2. In this case, this software accepts any change in the position and/or size of the display image 7 on the second PC 3 [according] in response to the dragging of the mouse 3.

Thus, if the title bar position of the display image
7 on the second PC 3 is dragged, a position change will be
accepted, or if the bottom right corner of the display image
7 on the second PC 3 is dragged, a size change will be
accepted.

The monitor device 1 so far described enables the user
to accomplish file transfers among other things from the
first PC 2 to the. second PC 3 or vice versa by using
communication software working on the first PC 2 or the
second PC 3 while watching the display on the monitor device
1. The user is also enabled to exchange directory
information or display information between the first PC 2
and the second PC 3 and cause the two PCs to operate in
[coordination]. For instance, the user may manipulate the
mouse 3 to accomplish file drag-and-drop displaying between
the display image 7 on the second PC 3 and the display image
6 on the first PC 2, together with a file transfer between
the first PC 2 and the second PC 3 interlocked with the file
drag-and-drop displaying.

Incidentally, while the display data sent from the
first PC 2 and the second PC 3 are supposed to be LVDS signals
in this embodiment, (some) other (form) of display data may be
used if the monitor device 1 is provided with an appropriate
interface.

Next, another mode of the use of the monitor device
~~will be described with reference to~~ ~~[is illustrated in]~~ Fig. 9.

As shown in Fig. 9, a keyboard 141 and a mouse 142 are
connected to a monitor device 138. _illustrate the_
~~[Next are illustrated in]~~ Fig. 10 _illustrate the_ connective
relationships of the monitor device 138 to the first PC 2,
the second PC 3, the keyboard 141 and the mouse 142.

As illustrated, the connections of the monitor device
138 to the first PC 2 and the second PC 3 are similar to the
corresponding connections shown in Fig. 1. Note should be
taken of the fact that, in Fig. 10, the monitor device 138
is connected _directly_ to the keyboard 141 and to the mouse 142
respectively by _way of_ a keyboard input signal transmission line
151 and a mouse input signal transmission line 152, each
fitted to the monitor device 138 via a connector. Both the
keyboard input signal transmission line 151 and the mouse
input signal transmission line 152, like the first
communication data transmission line 15 and the second
communication transmission line 18, consist of a USB.

Now, in the configuration of Fig. 9, in addition to the
actions described with reference to Fig. 1, the keyboard 141
and the mouse 142 connected to the monitor device 138 can
be used as input devices for the first PC 2 and the second
PC 3. Furthermore, the contrast, brightness and/or position

adjustment of [displaying] *the display* on the monitor device 138 can be

altered from the keyboard 141.

Fig. 11 shows the configuration of the monitor device

138 [making possible] *which makes* /such operations/ *possible*.

As illustrated, the configuration of the monitor

device 138 differs from the monitor device 1 in Fig. 1 in

that the keyboard input signal transmission line 151 and the

mouse input signal transmission line 152 are connected to

the communication controller 153. The monitor device 138

also differs from the monitor device 1 in Fig. 4 in the

configuration and actions of the communication controller

153.

Therefore, details of this communication controller

153 will be described below.

Fig. 12 illustrates the configuration of the

communication controller 153.

As illustrated, the communication controller 153,

like the communication controller 21 in Fig. 4, comprises

a communication data identifying unit 169, a window

information generating unit 53 and a liquid data conversion

control signal generating unit 127.

Here, communication data sent from the first PC 2 via

the first communication data transmission line 15,

communication data sent from the second PC 3 via the second

communication data transmission line 18, keyboard input

signals sent from the keyboard 141 via the keyboard input

signal transmission line 151, and mouse input signals sent

from the mouse 142 via the mouse input signal transmission

line 152 are sent to the communication data identifying unit

169.

Now, the (actions) of the window information generating

unit 53 and the liquid data conversion control signal

generating unit 127 are similar to those of the

communication controller in Fig. 4. Also, the communication

controller 153 operates in the same way as the communication

controller 21 in Fig. 4 except in the following respects.

For some specific key manipulations of the keyboard

141, input device output PC switching, display contrast

alteration for the monitor device 138, display brightness

alteration for the monitor device 138, and display position

adjustment alteration for the monitor device 138 are

allocated in advance.

Then, the communication data identifying unit 169 is

so disposed as to monitor all the time keyboard input signals

sent from the keyboard 141 via the keyboard input signal

transmission line 151. Keyboard input signals representing

other key manipulations than the aforementioned specific

ones are either sent to the first PC 2 via the first

communication data transmission line 15 as communication

data or to the second PC 3 via the second communication data

transmission line 18 as communication data. The PC to transmit the keyboard input signals is switched when a key manipulation to switch the input device output PC is detected. Further, the communication data identifying unit 169 transmits mouse input signals sent from the mouse 142 via the mouse input signal transmission line 152 to the PC transmitting the keyboard input signal via the first communication data transmission line 15 or the second communication data transmission line 18 as communication data.

The keyboard 141 and the mouse 142 connected to the monitor device 138 are thereby enabled to be used as input devices for both the first PC 2 and the second PC 3.

Further, the communication data identifying unit 169, when it has detected a specific key manipulation for display contrast alteration for the monitor device 138, display brightness alteration for the monitor device 138, or display position adjustment alteration for the monitor device 138, hands over the content of the alteration represented by that key manipulation to the liquid data conversion control signal generating unit 127.

It is thereby made possible to alter the display from the keyboard 141 connected to the monitor device 138 [device 138].

Incidentally, it may also [as well] be so disposed as to permit position and size alteration of the display image 7

on the second PC 3 similar to alteration of the contrast,
brightness and/or position adjustment of the display on the
monitor device 138. Also, as the mouse 142 is connected to
the monitor device 138, it may be so arranged as to have the
monitor device 138 manage the position and size of the
display image 7 on the second PC 3 and to accept their
alteration according to the user's manipulation of the mouse
142. In this case, the monitor device 138 accepts alteration
of the position and size of the display image 7 on the second
PC 3 in ⟨accordance with⟩ *response to* the dragging of the mouse 3. Thus,
when it has detected dragging of the title bar position of
the display image 7 on the second PC 3, it alters the position
of the display image 7 on the second PC 3 instead of sending
the content of the manipulation to the first PC 2 or the
second PC 3, or when it has detected dragging of the right
bottom corner of the display image 7, it alters the size of
the display image 7 on the second PC 3 instead of sending
the content of the manipulation to the first PC 2 or the
second PC 3.

Fig. 13 illustrates still another mode of use of the
monitor device.

As illustrated, the keyboard 141 and a camera 188 are
connected to a monitor device 184, and the mouse 5 is
connected to the first PC 2.

[Next, the] connective relationships of the monitor device 184 to the first PC 2, the second PC 3, the keyboard 141 and the mouse 142 are shown in Fig. 14.

As illustrated, the connections of the monitor device 184 to the first PC 2 and the second PC 3 are similar to the corresponding connections shown in Fig. 9. In the mode of use illustrated in Fig. 13, the monitor device 184 is connected to the keyboard 141 and to the camera 188, respectively, by the keyboard input signal transmission line 151 and a camera input signal transmission line 210. Both the keyboard input signal transmission line 151 and the camera input signal transmission line 210, like the first communication data transmission line 15 and the second communication transmission line 18, consist of a USB.

As shown in Fig. 15, an image represented by camera input signals from the camera 188 connected to the monitor device 184 can be displayed within the display image 6 of the first PC 2 displayed on the monitor device 184 as the display image 191 of the camera.

Fig. 16 illustrates the configuration of the monitor device 184 which makes [possible] such actions possible.

As shown in Fig. 16, the configuration of the monitor device 184 features the connection of the keyboard input signal transmission line 151 and the camera input signal transmission line 210 to the communication controller 153.

As a result, the monitor device 184 are characteristic in
the configurations and actions of the communication
controller 211 and the display controller 218.

First will be described details of this communication
controller 211.

Fig. 17 illustrates the configuration of the
communication controller 211.

As illustrated, the communication controller 211,
like what is shown in Fig. 5, comprises a communication data
identifying unit 300, the window information generating
unit 53 and the liquid data conversion control signal
generating unit 127.

Here, communication data sent from the first PC 2 via
the first communication data transmission line 15,
communication data sent from the second PC 3 via the second
communication data transmission line 18, keyboard input
signals sent from the keyboard 141 via the keyboard input
signal transmission line 151, and camera input signals sent
from the camera 188 via the camera input signal transmission
line 210 are entered into the communication data identifying
unit 300.

Now, the actions of the window information generating
unit 53 and of the liquid data conversion control signal
generating unit 127 are similar to those described above
with reference to Fig. 5. Also, the actions of the

communication controller 211 are the same as those of the

communication controller 21 shown in Fig. 5 except in the

following respects.

Thus, the communication data identifying unit 300

processes keyboard input signals sent from the keyboard 141

via the keyboard input signal transmission line 151 in the

same manner as described with reference to Fig. 12. This

enables the keyboard 141 connected to the monitor device 184

to be used as the input device for the first PC 2 and the

second PC 3.

Also the communication data identifying unit 300

sends camera input signals sent from the camera 188 via the

camera input signal transmission line 210 to the display

controller 218 as camera display data 217.

Next will be described details of the display

controller 218.

Fig. 18 illustrates the configuration of the display

controller 218.

As illustrated, the configuration of the display

controller 218 is such that a camera data converter 225 and

a camera data selector 235 are added to the display

controller 24 of Fig. 6.

The camera data converter 225 converts the camera

display data 217, which are serial data, into camera display

parallel data 229, which are parallel data like the

superposed display data 35. Along with this conversion, it generates a camera display position instructing signal 230 for instructing what part of the liquid crystal display 222 a camera image displayed position 199 should be displayed in.

The reference display position for the camera image [displayed] position 199 here [being supposed] to be a position set in the camera data converter 225 in advance, and the size of the camera image [displayed] position 199 matching the resolution of the camera display data 217, the camera data converter 225 generates the camera display position instructing signal 230. For instance, Fig. 15 illustrates a case in which the resolution of the camera display data 217 is 320 × 240 dots, and in this instance the sizes of the camera image display position [191] in the horizontal and vertical directions are respectively 320 dots and 240 dots.

Further, the camera data converter 225 supplies as this camera display position instructing signal 230 a single bit signal which is "0" when the scanning position of the monitor device 184 is [in] a position [not to display] the camera image [displayed] position [191] or "1" when it is [in] a position [to display] the camera image [displayed] position [91]. [To add,] [the] camera display parallel data 229 [here are supposed] to be display data of eight bits each of RGB (16.7 million color display).

Next, the camera data selector 235, in accordance with the camera display position instructing signal 230, switches the superposed display data 35 and the camera display parallel data 229 so as to supply the camera display parallel data 229 in the display timing of the camera image displayed position 191, and supplies the data to the liquid data converter 36 as camera superposed display data 236. Here it supplies the superposed display data 35 when the camera display position instructing signal 230 is "0" and the camera display parallel data 229 when the signal is "1".

The liquid data converter 36 converts the camera superposed display data 236, which are parallel RGB data of RGB of eight bits each, into input signals for the liquid crystal display 26, and supplies the converted data as the liquid crystal display data 25.

This makes it possible to display an image represented by camera input signals from the camera 188 connected to the monitor device 184 within the display image 6 of the first PC 2 displayed on the monitor device 184 as the camera display image 191.

Also, the monitor device 184 may send, according to a specific manipulation of the keyboard 141 connected to the monitor device 184, the camera input signals from the camera 188 to the first PC 2 or the second PC 3 as communication data.

Further, the position and size of the camera display image position 199 may be disposed to be alterable by the same technique as that for the display image 3 of the second PC 3 described above.

Modes of implementing the present invention [has] been described so far.

As hitherto described, the invention can provide a monitor device capable of displaying output display images of a plurality of computers at the same time. The invention also enables the user to use, without having to leave a specific input device, that specific input device and a specific monitor device as the monitor device and input device of a plurality of computers.